YUKON PLACER MINING GUIDELINES

DRAFT FOR DISCUSSION PURPOSES

FEBRUARY 1983

YUKON PLACER MINING GUIDELINES
DRAFT FOR DISCUSSION PURPOSES

TABLE OF CONTENTS

		Page
FOREWORD		(iii)
I	INTRODUCTION	1
	A. Historical Outline of the Placer Mining Industry	1
	B. Regulation of the Placer Mining Industry in the Yukon Territory	2
	C. History of Guideline Development	5
	D. Guidelines Framework	7
II	GOVERNMENT POSITION PAPERS	9
	A. The Department of Indian Affairs and Northern Development	9
	B. The Department of Fisheries and Oceans and Department of Environment	11
III	THE DEVELOPMENT PLAN	14
	Outline for the Preparation of a Development Plan	14
	A. Description of the Project	14
	B. Placer Testing Programs	16
	C. Placer Mining Programs	17

TABLE OF CONTENTS (Cont'd)

		Page
IV	FISHERIES CLASSIFICATION RATIONALE	22
V	OPPORTUNITY TO CHALLENGE CLASSIFICATION	25
VI	MINING PRACTICES AND REHABILITATION	28
	A. General	28
	B. Site Specific	32
	Operational Standards for High Significance Areas (A)	32
	Operational Standards for Moderate Significance Areas (B)	34
	Operational Standards for Moderate Significance Areas (C)	35
	Operational Standards for Low Significance Areas (D)	38
	Operational Standards for Designated Areas (X)	39
VII	SUMMARY OF SITE SPECIFIC MINING PRACTICES	40
VIII	COMPLIANCE SCHEDULE	41
IX	BIBLIOGRAPHY	43

FOREWORD

The objective of this document is to present proposals for new guidelines for the management of water in Yukon placer mining operations. Prior to implementation, it is intended that these proposals be reviewed publicly in Yukon to allow full comment on their possible effects on the placer mining industry, on the sports, commercial and native fisheries and on the natural environment.

If adopted by the Federal government, the new guidelines would replace those in effect since 1976. Like the existing guidelines, the new ones would be used by the Controller of Water Rights, Department of Indian Affairs and Northern Development, in attaching conditions to Authorizations for the use of water in placer operations. They could also be used by the Yukon Territory Water Board in the issuance of Water Licences to placer operators.

New guidelines have been demanded by the placer mining industry for several years. The industry has objected to what it perceives as inconsistency in the regulatory regime and to the element of personal judgement and discretion of the Controller in the issuance and enforcement of water use authorizations. The new guidelines are intended to reduce or remove those problems.

These guidelines would be issued under the authority of the Northern Inland Waters Act and the Northern Inland Waters Regulations, Section 11. The guidelines are also intended to be consistent with the Canada Fisheries Act and the policies of the federal Department of Fisheries and Oceans, and Department of the Environment in the administration of the Act.

The proposed guidelines therefore have been prepared as an interdepartmental effort involving the Department of Indian Affairs and Northern Development (DIAND), the Department of Fisheries and Oceans (DFO) and the Department of Environment (DOE) as they should have the support of all three Departments. An Interdepartmental Committee on Placer Mining (ICPM) was established for this purpose, comprising the following: D.M. Watson, DIAND (Chairman), F. Fraser, DFO; C.E. Wykes, DOE. The Committee established an interdepartmental Working Group which drew upon the expertise, resources and experience of the Departments, the Yukon Territorial Government, consultants, the industry, and the literature. In the course of preparing the guidelines from late 1981 to the fall of 1982, the ICPM and the Working Group met on two occasions with representatives of the Klondike Placer Miners' Association, and their views on the issues and proposals have been sought and obtained. Similarly, the ICPM gave considerable attention to the concerns of the Yukon Territorial Government and the input of YTG to this process is acknowledged.

The Interdepartmental Committee on Placer Mining submits these proposals to government for its review and consideration in anticipation of their release for public review in late 1982 - early 1983.

Whitehorse, Y.T.
October 28, 1982

D.M. Watson,
DIAND.

F. Fraser,
DFO.

C.E. Wykes
DOE.

I INTRODUCTION

A. HISTORICAL OUTLINE OF THE PLACER MINING INDUSTRY

As early as the 1850's, the presence of gold in Yukon streams had been recorded. However, not until 1886 with the discovery of gold in the Forty-mile River was placer mining conducted on any large scale. In August, 1896, a man named George Carmacks staked a discovery claim on Rabbit Creek (later renamed Bonanza) which sparked the great Klondike Gold Rush a few years later.

By the early 1900's the Klondike Gold Rush - unprecedented in its size - was finished. The large placer gold deposits worked by hand had been depleted and the introduction of machinery about 1901 coincided with this depletion of exceptionally rich deposits. Many claims, deemed uneconomic to mine by hand, were sold to dredging companies. By 1905 when the first of the large scale dredges appeared in the Klondike valley, the gold fields had been taken over by mining corporations. The placer mining industry was essentially dominated by these dredging operations until 1966 when production costs and the fixed price of gold ($35/ounce) made gold recovery uneconomical. After this period, the Yukon economy dropped drastically along with placer mining activity.

In 1972, gold was released from its fixed price of $35 an ounce and allowed to float on the world market. As the price of gold rose, new interest was sparked and the Yukon placer mining industry experienced renewed growth. In 1981 the reported placer gold production in Yukon exceeded $55,000,000.

B. REGULATION OF THE PLACER MINING INDUSTRY IN THE YUKON TERRITORY

Prior to the early 1970's there was very little environmental legislation specifically dealing with Placer Mining. Since that time, there has been an increased environmental awareness in Canada and the need to address environmental controls for the placer industry became more evident. The Department of Indian Affairs and Northern Development (DIAND), in conjunction with the Department of Fisheries and Oceans (DFO) and Department of Environment (DOE), is proposing a multiple resource management approach to regulation of this industry. This regulatory concept will enhance protection for fish, wildlife and land resources, while allowing the exploitation of placer gold deposits.

DIAND acts as coordinator for the activities of the Government departments having jurisdiction in the North, through a "one-window" approach. This means that certain legislative responsibilities of the Department of Fisheries and Oceans and Department of Environment and the conditions to meet these responsibilities will be provided for through the DIAND permit issuing process.

The existing Federal and Territorial legislation that can be used to regulate the Yukon placer mining industry is as follows:

1. FEDERAL LEGISLATION

(a) Canada Fisheries Act (1867)

Subsections 31(1) and (2) (amended in 1977) prohibit the harmful alteration, disruption or

destruction of fish habitat except under specific conditions authorized by the Minister of Fisheries.

Subsections 33(2) and (4), (amended in 1977) prohibit release of substances deleterious to fish in Canadian waters unless regulations under that Act or any other act set out allowable limits for such contamination.

In the absence of express regulations defining such limits, Fishery Officers responsible for compliance with the Fisheries Act can take legal action against placer mining operations.

There are provisions under this act to implement regulations.

(b) Northern Inland Waters Act (1970)

The Northern Inland Waters Act provides for the Governor in Council to prescribe water quality standards in Section 26(e). The Governor in Council may also prescribe the quantities of waste that may be deposited in waters, other than in accordance with a licence [Section 26(f)]. In the case of a licence, the Water Board may prescribe conditions not less stringent than those set by the Governor in Council pursuant to Section 26(e) or those contained in any other Act.

The Northern Inland Waters Act (NIWA) provides for use of water through:

(i) a water licence issued by the Yukon Territorial Water Board (YTWB) following public hearings; or

(ii) an Authorization to use water without a licence. This is issued by a Controller who is responsible to the Minister of DIAND. Authorizations may only be issued for small volumes, short periods or for certain specified uses as prescribed by regulation (Section 11, Northern Inland Waters Regulations.)

Most placer mining operations have been granted water rights under authorizations issued by the Controller.

(c) Yukon Placer Mining Act (1906)

The Yukon Placer Mining Act which regulates the staking of mineral rights was enacted in 1906. Sections 54 - 69 of the Act, pertaining to the use and control of waters on claims were revoked by Section 39 of NIWA.

2. TERRITORIAL LEGISLATION

(a) Wildlife Act

Regulations to this Act control wildlife use and other impacts, including handling of garbage.

(b) Forest Protection Act

Provides for the control of fires, insects and disease.

(c) Gasoline Handling Act

Regulates the transportation, storage and handling of petroleum products.

(d) Public Health Act

Provides regulations respecting health, sanitation and aesthetics.

C. HISTORY OF GUIDELINE DEVELOPMENT

Soon after the Yukon Territory Water Board first received applications for water use in placer mining in 1972 it became apparent that formal licensing procedures were too cumbersome and time-consuming for the rapidly growing number of placer operations. Through a series of public hearings held in November 1973, September 1974 and 1975 in Yukon Territory, the Board recommended that water use in placer mining be permitted through authorizations to use water

without a licence issued by the Controller of Water Rights. In 1974 all placer applicants were authorized to use water for the first time. By 1975 guidelines were developed and first implemented for the 1976 operating season.

In 1979, hearings were held regarding changes in the guidelines. The Yukon Territory Water Board decided at that time that the issues extended beyond those which were only water related and requested the Minister to provide policy or legislative guidance. The Minister of DIAND requested in the fall of 1979 that placer mining related studies be undertaken. A placer mining study group was established that included both Government and Klondike Placer Miners Association (KPMA) representatives. KPMA participated in the development of the studies and shared funding for a study done by Hardy Associates Ltd. Concurrently, DIAND discussion papers and memoranda to Cabinet were developed through 1980 and reviewed by DFO and DOE.

The Yukon Chamber of Mines and the KPMA were made aware of this process and commented on the draft discussion papers at a meeting held in Whitehorse in March, 1981. Subsequently, the three federal departments agreed that placer mining was not a special case to be exempted but was an ongoing, viable industry that should be regulated in a manner similar to other industrial sectors.

The Assistant Deputy Minister (DIAND) directed the Yukon Regional Director to initiate guidelines development in 1981 with the support and cooperation of DFO and DOE. Meetings

were held between the KPMA, Yukon Chamber of Mines, Yukon Territorial Government, DIAND, DFO and DOE at which respective positions were presented and discussed. Agreement was reached to continue this process which would ultimately involve a public review of the parties' positions.

D. GUIDELINES FRAMEWORK

In the following sections, the federal position is outlined regarding general and specific conditions that are proposed for the regulation of placer mining operations. The guidelines set conditions of operation in accordance with a rationale that considers renewable resources. While it is anticipated that in the future, issues such as wildlife, vegetation, downstream users, and compatability of present or planned water use in the area will be formally incorporated in the guidelines, at present only the fisheries resource aspects have been developed in detail.

The guidelines will be used as a document of Ministerial policy to the Controller in his issuance of authorizations and the YTWB in the issuance of licences to the placer mining industry. It is considered that some flexibility in their application will be required. In both the formalized aspects (fisheries) and the other areas, there will be a process of revision, development and of necessity, appeal conducted on an ongoing basis.

It should be noted that some aspects of water use are not covered under these guidelines. General requirements, including maintenance of works, spill reporting, sample

collection, data reporting, notice of cessation of operati and liability are not here discussed and will continue to apply to future authorizations.

In addition, site specific constraints will continue to determine water rights allocations and other measures particular to the site.

II GOVERNMENT POSITION PAPERS

A. THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

A POLICY STATEMENT ON PLACER MINING IN THE YUKON TERRITORY (February 18, 1982)

1. The Department of Indian Affairs and Northern Development (DIAND) recognizes the value of the Yukon placer mining industry to the economic base of the Territory and encourages a trend toward more efficient mineral management, production of increased social and economic benefits and more effective environmental conservation.

2. DIAND affirms the principle of integrated resource management as an objective to be attained through an ongoing process of resource evaluation (renewable and mineral), determination of significant environmental impacts, development planning, provision of mitigative measures, and rehabilitation.

3. Resource evaluation requires assessment of mineral reserves prior to mining operations, through recognized exploration methods. It also necessitates assessment of biological and related environmental values, including fish and wildlife, water, vegetation and aesthetics. In the absence of hard information, the onus may be on the

developer or his agent to supply it, according to guidelines provided by government.

4. The determination of significant environmental impacts will result from the submission of the aforementioned information to DIAND, who may also request an initial environmental evaluation from the developer. Screening of such information and assessments is the responsibility of DIAND, in conjunction with other federal departments or agencies, and the Yukon Territorial Government (YTG), according to guidelines established by government.

5. Development planning combines those undertakings that would promote modern mineral management (optimum recovery at least cost), engineering integrity and safety, required mitigative measures, and ongoing stabilization and rehabilitation.

6. Mitigative measures include any reasonable, attainable and cost-effective method of minimizing serious environmental degradation and of encouraging rehabilitation. Such measures could apply to such aspects as water quality, provision of fish passage, soil conservation, and habitat protection.

7. Rehabilitation procedures will ensure stream stabilization and vegetative growth on worked ground.

8. DIAND reaffirms, through its mandate under the Indian Affairs and Northern Development Act, its commitment to implement programs to achieve the foregoing principles through a "one-window" approach, i.e. by providing coordination of the activities of other federal departments having certain responsibilities in the North.

9. A Socio-Economic Impact Analysis (SEIA) will be carried out by DIAND prior to implementation of the revised regulatory regime.

10. A compliance schedule of one to five years will be developed prior to implementation.

B. THE DEPARTMENT OF FISHERIES AND OCEANS AND DEPARTMENT OF ENVIRONMENT

A JOINT POLICY POSITION RELATIVE TO THE YUKON PLACER MINING INDUSTRY (Extracted from "Yukon Placer Mining: A Position Paper" - December 1981)

1. It is recognized by the Department of Fisheries and Oceans (DFO) and the Department of Environment (DOE) that placer mining in the Yukon in its present form is incompatible with the maintenance of certain renewable resources, such as fish, and wildlife.

2. The Departments consider, however, that given appropriate controls placer mining can be carried out in a manner to minimize impacts on the renewable resource values.

3. Where mining activities occur, they must be conducted in a manner which protects the natural environment and provides for the rehabilitation of any damage which may occur.

4. DFO and DOE agree with the Department of Indian Affairs and Northern Development (DIAND) that a new or revised administrative/regulatory framework is required to manage placer mining. DFO and DOE suggest that the following principles be adopted in formulating such a framework:

4.1 Placer mining must be regulated to protect fish and wildlife habitat and associated resources.

4.1.1 Where placer mining occurs, restrictions are to be applied to minimize environmental impacts during the exploration and operational phases and to ensure necessary rehabilitation.

4.1.2 An approved development plan (exploration to abandonment) is required prior to commencement.

4.2 Effective monitoring and surveillance programs must be carried out.

4.2.1 Restrictions are to be enforced.

4.2.2 The environmental quality must be assessed during and after mining to ensure that control measures are adequate.

5. To facilitate implementation of these principles, DFO and DOE have outlined an approach which will provide the necessary protection to renewable resources yet allow continued placer mining activity. The basis of this approach is to identify:

5.1 Categories of resource sensitivities based on the biological importance or value of the fish and wildlife resources.

5.2 Restrictions to protect these renewable resources;

5.3 Status of mining activity within the watershed of a waterbody; and

5.4 A compliance schedule to meet the restrictions.

III THE DEVELOPMENT PLAN

A development plan will be required by DIAND with the water-use application and would identify all the proposed activities and phases of operation for the proposed life of the project. It will, in essence, consist of a number of sub-plans to show how the operation will progress at all stages and how the project will meet the required standards and mitigate the environmental impact.

The development plan or changes thereto will be assessed by the regulatory agencies, through a "one-window" review process, as to its adequacy and when the information presented is accepted as satisfactory, DIAND will approve the plan. If the information is determined to be incomplete DIAND will request more information. When the development plan is evaluated and approved a water use authorization may be issued by the Controller. Similar information should be provided for the YTWB for their review of water use licence applications.

OUTLINE FOR THE PREPARATION OF A DEVELOPMENT PLAN

A. DESCRIPTION OF THE PROJECT

A thorough description of the planned project, the methods to be used for mining, water diversions, wastewater treatment, the scheduling and duration of the operation, and mine site and stream rehabilitation shall be developed as outlined below. Every miner will be required to produce a description of the project. However, only those operators involved in testing their ground will be required to develop a description under Section B - Placer Testing Programs.

Likewise, only those operators actually mining must develop Section C - Placer Mining Programs.

1. Property Size and Location

A detailed description of the size and location of the property shall be provided as follows:

1.1 Location and Description

Shall be detailed on a map of no smaller scale than 1:50,000. A general description and photographs of the property focusing on vegetation types, surface water and drainage conditions are essential where soil and vegetation maps are not available.

1.2 Specific Details

Shall be detailed on maps of appropriate scale (1:100 to 1:2000) showing:

1.2.1 Number of claims with claim numbers and number of leases with their lease numbers;

1.2.2 All streams and intermittent streams on or near the property;

1.2.3 Proposed access routes and all proposed facilities: camps, cabins, roads, airstrips, etc.

2. Equipment

A description of the equipment including numbers and sizes of pumps, models of dozers, scrapers and backhoes, front-end loaders shall be provided.

3. Basic Geology

A general description of the geological features of the area must be provided.

B. PLACER TESTING PROGRAMS

The exploration work will assist the proponent in evaluating the economic constraints involved in developing the property and the constraints that certain environmental conditions will impose on the developer.

The specific information required is:

1. A brief history of past workings on the property.

2. A description of the method of exploration, proposed access and extent of exploration being proposed.

3. The proposed scheduling.

4. Water requirements - sources and methods of obtaining water, rate of water acquisition, design of stream diversions and waste water treatment systems and other intended uses.

5. Use of any chemicals in the process.

6. Anticipated environmental impacts and proposed control measures.

7. Rehabilitation plans for explored areas if mining not carried out.

C. PLACER MINING PROGRAMS

1. Operations

The operations phase in a development plan will consist of several components:

A detailed layout, on a map of appropriate scale (1:100 to 1:2000), of the mining operation showing the area to be mined, stream location, water supply, disposal area, ponds, campsite, fuel storage, and any other details of the operation.

A detailed description of these maps to explain the layout is necessary.

More specifically, the types of information that will be required in the maps and accompanying description for each set-up and phase are identified below:

1.1 Description of Deposit and Mining Methods

1.1.1 Description of soil material types and characteristics.

1.1.2 An outline of the extent of paydirt zone, estimating volumes of paydirt and estimating volumes of overburden to be removed.

1.1.3 Depth and extent of permafrost.

1.1.4 Method of soils material removal and storage, including volumes and location.

1.1.5 Method of debris removal and storage.

1.1.6 Details of paydirt handling and storage prior to sluicing.

1.1.7 Details (mapped at a scale of 1:100 - 1:2000) of debris and soil material storage.

1.2 Water Sources and Volumes

1.2.1 Proposed water sources and their storage location.

1.2.2 Estimated low, mean and peak stream flows.

1.2.3 Effects of operations on downstream water users.

1.2.4 A determination of the potential for glaciations (aufeis) and their anticipated location shall be provided.

1.2.5 Method of obtaining water and delivery method.

1.2.6 Rate of water acquisition required for sluicing, domestic use and any other uses.

1.2.7 Use of any chemicals associated with the process.

1.2.8 Frequency of water use.

1.2.9 Where applicable, plans for stream diversions and their timing.

1.2.10 Size and design of sluice box or gold recovery device and the rate of water use required.

1.2.11 Any changes in water usage that may be planned.

1.3 Water Treatment

1.3.1 Quantity and quality of process water to be treated.

1.3.2 Method of treating process water.

1.3.3 Detailed specifications of the treatment facility and process.

1.3.4 Expected suspended solids concentration to be achieved.

1.3.5 Maintenance schedule of treatment facility.

1.3.6 Point of discharge for treatment facility.

1.3.7 Any planned changes in treatment facilities.

2. Rehabilitation

The development plan must address this prior to the operational phase for new operations or during the operational phase for existing mines. The rehabilitation process will be continual and progressive with the operational phase.

Specifically, the items that shall be addressed with respect to rehabilitation are:

2.1 Rehabilitation plan submitted on a yearly basis, for the worked-over areas including the tailings and stored debris areas and where applicable, to provide for re-establishment of aquatic habitat.

2.2 Detailed plans for any revegetation to be done.

2.3 The disposal of surplus equipment, buildings or supplies.

IV FISHERIES CLASSIFICATION RATIONALE

To allow placer mining operations to occur and yet to ensure the fisheries resource in Yukon is protected, a priority protection schedule has been developed. This separates the important commercial, sport or subsistence fish species in Yukon into two groups as outlined below. This classification is in accordance with the habitat protection policy of the Department of Fisheries and Oceans which calls for no net loss of fish and fish habitat required to maintain Canada's economically and socially important fisheries resources.

SCHEDULES OF FISH SPECIES

Schedule I

Chum salmon (*Oncorhynchus keta*)
Chinook salmon (*Oncorhynchus tshawytscha*)
Coho salmon (*Oncorhynchus kisutch*)
Sockeye/kokanee (*Oncorhynchus nerka*)
Rainbow trout (*Salmo gairdneri*)
Arctic char (*Salvelinus alpinus*)
Lake trout (*Salvelinus namaycush*)
Dolly Varden (*Salvelinus malma*)

Schedule II

Arctic grayling (*Thymallus arcticus*)
Inconnu (*Stenodus leucichthys nelma*)
Humpback (Lake) whitefish (*Coregonus clupeaformis*)
Broad whitefish (*Coregonus nasus*)
Least cisco (*Coregonus sardinella*)

Arctic cisco (Coregonus autumnalis)
Burbot (Lota lota)
Northern pike (Esox lucius)
Round whitefish (Prosopium cylindraceum)

The distinction between schedules of fish is made by the way in which the fish spawn. Schedule I fish dig pits or "redds" in the stream gravels to deposit their eggs. These fish then "backfill" the pit or "redd" with excavated gravels.

Schedule II fish, however, merely "broadcast" their eggs onto the surface of the stream bed. No depressions are made nor are the eggs covered up by the fish.

Because Schedule I fish lay their eggs in, rather than on, the streambed, siltation of these eggs and consequent smothering of them is more of a concern than siltation of eggs laid on the gravels. Therefore, in the classification system, Schedule I fish are afforded more protection.

Superimposed on the scheduled species valuation is the consideration of life cycle sensitivities. The spawning life cycle phase, from egg deposition through incubation to emergence is considered to be the most sediment-sensitive life phase for a fish. Rearing, that life cycle aspect involving growth from a juvenile into an adult, is considered to be less sensitive.

The classification system designates portions of streams as "reaches", rather than an entire stream or watershed. The reaches are classified or evaluated on a habitat quality basis, generally, rather than on a population size basis by using the physical characteristics of the terrain in each stream in conjunction with

the known presence and life history of each fish species. To do this, the following criteria were used:

1) D.F.O. staff knowledge of the area.
2) Stream reach habitat type within a system.
3) Relationship to known fisheries resources.
4) Similarity to other systems with known fisheries resources.
5) Stream slope.
6) Elevation.
7) River or stream width.
8) Available food sources.
9) Life histories of each species.
10) Migratory patterns of each species.
11) Habitat overwintering capabilities.
12) Length of stream from source to probable fish utilization.
13) Continuous or intermittent nature of stream flow.
14) Connections from one lake to another.
15) Valley shape: "V", "U" and wide flat-bottomed.
16) Association to known marshes, bogs and beaver dams.
17) Known barriers such as waterfalls.
18) Potential for enhancement.

The resultant reach classification then is:

1) A designation - Schedule I spawning area.
2) B designation - Schedule I rearing area.
3) C designation - Good Schedule II habitat.
4) D designation - Other Schedule II habitat (or total absence of habitat)
5) X designation - Previously designated placer mining area.

V. OPPORTUNITY TO CHALLENGE CLASSIFICATION

If the proponent accepts the classification specified for his particular operation no baseline environmental data will need to be collected. However, if the operator requests a downgrade in classification on his stream or reach, he will need to gather the baseline information for the area.

As new information becomes available, the Department of Fisheries and Oceans reserves the right at any time to upgrade or downgrade stream reach classification. DFO intends to justify all changes in classification in a manner similar to that required of the placer operator.

Biophysical information should be based on relevant scientific reports and on-site investigations. The data requested in this section will allow the biological importance and significance of the aquatic resources to be evaluated by the regulatory agencies. The following outline of areas which the proponent should address serves as a guide, but the proponent should consult the regulatory agency for additional details relating to the scope and magnitude of investigations to be carried out.

1. Water

One of the most significant impacts of placer operations is on water quality. The following information is therefore necessary:

1.1 Water Quality

Data on the following water quality parameters obtained every second month during the open water period for pre-operation conditions should be supplied for stations upstream and downstream of the operation:

- temperature
- pH
- conductivity
- dissolved Oxygen
- non-filterable residue
- total residue
- Arsenic (Dissolved)
- Mercury (Total)

Additional water quality parameters may be necessary depending on the geological nature of the area to be disturbed.

1.2 Hydrology

Estimates or measurements of flood frequency and of base or low flow are required for diversion design, retaining dykes and water use conflicts. Locations of domestic and industrial water supply intakes downstream of the operation and the effects of operations on downstream users must be addressed.

2. Fish

Information must be provided on the fish habitat in all relevant reaches. The evaluation will be determined by collecting information on the benthic invertebrate population, water depth and velocity, substrate composition, stream side vegetation, and reach characteristics.

Where the habitat indicates fish should be present in some life cycle phase in the reach and where no fish are found, an explanation of their absence will be required (e.g. there is a waterfall or other impediment to fish passage downstream; fish have moved downstream into larger tributaries).

A suggested acceptable method for collecting data and providing a description is illustrated in "A British Columbia Stream Habitat and Fish Population Inventory System" by A.D. De Leeuw.

VI MINING PRACTICES AND REHABILITATION

Watercourses will be divided into five classifications (A, B, C, D and X). The proposed guidelines are designed to consider environmental sensitivity levels in the five orders of classification that take into consideration their relative renewable resource and environmental value. The guidelines for each classification are listed in Section B - Site Specific Mining Practices. A table showing a summary of these is located on page 41.

There are certain guidelines generally applicable to any placer mining operation, regardless of the stream reach classification. Such standards are listed below. The intent of the guidelines is not to restrict any mining activity as long as mining practices and rehabilitation standards are met.

A. GENERAL

1. REHABILITATION

The following operating conditions apply to high, moderate and low significance areas:

1.1 A bond or security deposit will be required from the operator to ensure rehabilitation is carried out.

1.2 Tailings and other materials shall be bladed to meet the contour of the valley walls. Conical or other mounds of tailings or gravels shall not be left in valley bottom. Slopes on all remaining low relief piles should be less than 2:1 (Microtopography of mounds less than 1 to 2 meters in height are best).

1.3 Smooth tailings ramps with long slope lengths shall be modified to provide mounds or contours perpendicular to the ramp slope (maximum mound height should be less than 1 meter).

1.4 Topsoil and other suitable soil materials shall be salvaged, prior to any mining activity and stored for use in rehabilitation. The purpose of this material is to provide, where possible, a minimum of 10 centimeters of cover to aid in revegetation.

1.5 Streams (natural and man-made) shall be maintained or constructed in accordance with design criteria specified under operating conditions. In low significance areas the constructed channel slopes shall be reduced by zig-zagging or creating sinuous channels compatible with the erosion resistance of the soils in which they are constructed.

2. FUEL STORAGE AND HANDLING

2.1 The operator shall establish storage and handling sites for fuel and hazardous material to minimize any contamination of any surface or ground water and the threat to wildlife, fish habitat or fish harvesting area.

2.1.1 The operator shall establish procedures to contain and cleanup fuel or other hazardous material spilled, misused or allowed to escape during normal fuel transfers and for unanticipated events involving loss of fuel.

2.1.2 The operator shall locate fuel storage areas containing an above ground tank exceeding 2300 litres in capacity at least 30 meters from the annual high water level of a waterbody and surrounded by an impermeable dyke (synthetically lined or constructed with impervious materials) to contain and retain the product.

2.1.3 The operator shall locate fuel storage sites where less than 2300 litres capacity is stored at least 30 meters from the annual high water level of a waterbody.

2.2 The loss of fuel from a storage facility or during transfer must be reported to the regulatory agency immediately (24 hour Spill Report phone number is 667-7244).

2.3 All operators will comply with the provisions of the Yukon Territory Gasoline Handling Act.

3. DOMESTIC WASTE WATER

3.1 The Holder shall obtain a permit(s) for sewage, refuse and garbage disposal at his camp(s) pursuant to Commissioner's Order(s) 1974-65 and 1961-3B, Public Health Act R.O. 1958, c.92, s.1.

3.2 Sewage treatment facilities shall not be located less than 30 meters from any water supply, lake, stream or other watercourse without prior approval of the Controller.

4. GARBAGE

All garbage and refuse shall be removed from the site or where appropriate, totally incinerated at locations not less than 30 meters from any water supply or stream and buried under not less than 1 meter of compacted soil.

5. ALL OTHER SOLID WASTE MATERIAL

The Holder shall remove to an appropriate location, all other waste material from operations including but not limited to scrap metal, discarded machinery and parts, barrels and kegs; prior to the expiry date of the authorization; or with prior approval upon site abandonment.

6. FISH PASSAGE

Where an operation is located downstream of an A, B or C reach classification, water withdrawal methods shall not prevent fish passage.

7. MONITORING

Regular monitoring of effluent and receiving water quality is the responsibility of the authorization holder.

B. SITE SPECIFIC

OPERATIONAL STANDARDS FOR HIGH SIGNIFICANCE AREAS (A)

1. Rate and Method of Water Acquisition

All water acquisitions for placer operations, shall be by pumping. If water is withdrawn from a fish

bearing stream, the pump must be screened to prevent the intake of fish.

2. Quality of Waste Water Discharge

There shall be no surface flow discharge of sediment contaminated waters to any stream (i.e. total recycle).

2.1 No discharge shall be toxic to fish.

3. Diversions

There will be no diversions of the stream.

4. Leave Strips

A vegetated strip 30 meters wide, shall be left intact on each side of the stream. A berm, where required, shall be constructed immediately adjacent to the leave strip, between the leave strip and the worked ground.

5. Equipment

Machinery and equipment shall not be operated within the wetted perimeter of the stream unless authorized.

OPERATIONAL STANDARDS
FOR MODERATE SIGNIFICANCE AREAS (B)

1. Rate and Method of Water Acquisition

All water acquisitions for placer operations shall be by pumping. If water is withdrawn from a fish bearing stream the pump shall be screened to prevent the intake of fish.

2. Quality of Waste Water Discharge

All discharges shall not exceed the following criteria at point of discharge:

Parameter	Maximum Concentration of Any Sample
Suspended Solids	100 mg/l* (see Compliance Schedule)
Oil & Grease	5 mg/l
Arsenic (Dissolved)	0.10 mg/l
Mercury (Total)	0.005 mg/l

* Above background - measured at headwaters (i.e. upstream of grounds disturbed by mining activity).

2.1 No discharge shall be toxic to fish.

3. Diversions

There will be no diversions of the stream reach.

4. Leave Strips

A vegetated strip 15 meters wide, shall be left intact on each side of the stream. A berm where required shall be constructed, immediately adjacent to the leave strip, between the leave strip and the worked ground.

5. Equipment

Machinery and equipment shall not be operated within the wetted perimeter of the stream unless authorized.

OPERATIONAL STANDARDS
FOR MODERATE SIGNIFICANCE AREAS (C)

1. Rate and Method of Water Acquisition

Water acquisitions for placer mining require fish screens to prevent the intake of fish, when water is withdrawn from a fish bearing stream and shall be located and protected in accordance with stability criteria specified under "Diversions."

2. Quality of Waste Water Discharge

All discharges shall not exceed the following criteria at point of discharge:

Parameter	Maximum Concentration of Any Sample
Suspended Solids	100 mg/l* (see Compliance Schedule)
Oil & Grease	5 mg/l
Arsenic (Dissolved)	0.10 mg/l
Mercury (Total)	0.005 mg/l

* Above background - measured at headwaters (i.e. upstream of grounds disturbed by mining activity.

2.1 No discharge shall be toxic to fish.

3. Diversions

3.1 If streamside cover is removed, other precautions must be undertaken to prevent unintentional non-point sediment discharges into the stream. Berming, site grading or any other method of accomplishing the above should be identified and approved prior to stream cover removal.

3.2 Design plans for any stream diversion should be developed by professional consultants and approved by DIAND through the "one-window" approach prior to implementation.

3.3 Stream diversions must be stable and, should additional A, B or C habitat exist upstream, be able to guarantee fish passage around the claim.

3.4 Efforts should be made to ensure that stream diversions are undertaken in such a manner that stream bank vegetation is preserved along at least one bank. This will ensure that the entry of nutrients in the form of leaf litter, detritus, and terrestrial insects into the aquatic environment is not interrupted.

3.5 Stream diversions are not to be made through areas where the depth of overburden precludes establishment of a stable channel.

3.6 Diversion channel construction may be undertaken at any time provided that this is done in isolation of streamflow. Initial flushing and diversion of streamflow should be undertaken during the short period of time during spring breakup when suspended solids concentrations are naturally high.

3.7 Rediversion of the stream channel to a position of long term stability and fish habitat rehabilitation is to be undertaken on a progressive basis so that each section of stream is stablized and made habitable to fish within two seasons after mining.

3.8 Diversions shall be designed to contain the one in ten year flood event.

OPERATIONAL STANDARDS FOR LOW SIGNIFICANCE AREAS (D)

1. Rate and Method of Water Acquisition

Water acquisition works shall be located and protected in accordance with stability criteria specified under, "Diversions."

2. Quality of Waste Water Discharge

All waste water discharges shall not exceed the following criteria at point of discharge:

Parameter	Maximum Concentration of Any Sample
Suspended Solids	100 mg/l or 1000 mg/l* (see Compliance Schedule)
Oil & Grease	5 mg/l
Arsenic (Dissolved)	0.10 mg/l
Mercury (Total)	0.005 mg/l
Settleable Solids	Less Than .1 ml/l

* Where a D category stream flows into an A, B or C category stream, the suspended solids content of the effluent shall be no greater than 100 mg/l above background measured at the headwaters (i.e. upstream of ground disturbed by mining activity). If a D category stream discharges into a major D category stream the suspended solids content of effluent to that stream shall not exceed 1000 mg/l.

2.1 No discharge shall be toxic to fish.

3. Diversions

Diversions shall be designed to contain the one in five year flood event.

4. Stream Stability

Stream hydraulic stability will be maintained to the same level of protection as is specified for diversions.

OPERATIONAL STANDARDS FOR DESIGNATED AREAS (X)

All standards for Low Significance Areas (D), except for water effluent standards, will apply for this classification. Water effluent standards which will be "phased-in" are presented in the Compliance Schedule on page 41.

VII SUMMARY OF SITE SPECIFIC MINING PRACTICES

REACH CLASSIFICATION	WATER ACQUISITION	ULTIMATE SUSPENDED SOLIDS EFFLUENT STANDARD	DIVERSIONS	LEAVE STRIPS
A	1) Taken by pumping only. 2) Screening required.	1) 0 mg/l suspended solids. 2) No toxic discharge.	Not permitted.	1) 30 meters wide, on both sides of stream. 2) A berm may be required.
B	1) Taken by pumping only. 2) Screening required.	1) 100 mg/l suspended solids. 2) No toxic discharge.	Not permitted.	1) 15 meters wide on both sides of stream. 2) A berm may be required.
C	Screening required.	1) 100 mg/l suspended solids. 2) No toxic discharge.	1) Must contain one in ten year flood. 2) Provision of fish passage. 3) Opened during spring freshet.	One bank to remain vegetated.
D	Screening required if fish present.	1) 100 mg/l if to A, B, C or D. 2) 1000 mg/l suspended solids if flowing into a major D. 3) No toxic discharge.	1) Must contain one in five year flood. 2) Fish passage if A, B or C upstream.	Not required.
X	Screening required if fish present.	1) 100 mg/l if to A, B, C or D. 2) 1000 mg/l suspended solids if flowing into a major D. 3) No toxic discharge.	1) Must contain one in five year flood.	Not required.

VIII COMPLIANCE SCHEDULE

All conditions of the guidelines package will become effective during the first year of guidelines implementation with the exception of the effluent standards. Operators on creeks presently being mined will be required to meet the water standards, on their particular reach, as outlined below. Operators who intend to begin new operations on creeks not mined before, will be required to commence their operations with the ultimate effluent standard being required during their first year of operation.

REACH CLASSIFICATION	SUSPENDED SOLIDS CRITERIA COMPLIANCE DATE
A	1984 - 100 mg/l 1985 - 0 mg/l
B	1984 - 100 mg/l
C	1984 - 1000 mg/l 1985 - 500 mg/l 1986 and 1987 - 300 mg/l 1988 - 100 mg/l
D	1984 - 1000 mg/l *1985 - 500 mg/l *1986 and 1987 - 300 mg/l *1988 - 100 mg/l
X	1984 - 1000 mg/l *1985 - 500 mg/l *1986 and 1987 - 300 mg/l *1988 - 100 mg/l

* These "phase-in" requirements are applicable to those reach classifications that do not discharge directly to major D reaches.

Another presentation of the Compliance Schedule is illustrated on page 42.

REACH CLASSIFICATION AND COMPLIANCE
SCHEDULE FOR SUSPENDED SOLIDS CRITERIA

REACH CLASSIFICATION	1984	1985	1986	1987	1988
A	100	0	0	0	0
B	100	100	100	100	100
C	1000	500	300	300	100
D to Major D	1000	1000	1000	1000	1000
D to all others	1000	500	300	300	100
X to Major D	1000	1000	1000	1000	1000
X to all others	1000	500	300	300	100

REFERENCES

1) Dane, B.C. 1978. A Review and Resolution of Fish Passage Problems at Culvert Sites in British Columbia. Department of Fisheries and Oceans. Fisheries and Marine Service Technical Report No. 810.

2) Dane, B.C. 1978. Culvert Guidelines: Recommendations for the Design and Installation of Culverts in British Columbia to Avoid Conflict with Anadromous Fish. Department of Fisheries and Oceans. Fisheries and Marine Service Technical Report No. 811.

3) De Leeuw, A.D. 1981. A British Columbia Stream Habitat and Fish Population Inventory System. B. C. Ministry of Environment.

4) Department of Fisheries and Oceans, Department of Environment. 1981. Fish Screening Specifications. Habitat Management Division. Unpublished guidelines.

5) Department of Fisheries and Oceans, Department of Environment, 1981. Yukon Placer Mining: A Position Paper.

6) Department of Fisheries and Oceans. 1982. Fisheries Information and Stream Reach Classification Maps.

7) Department of Fisheries and Oceans, Department of Environment, 1983. A Rationale for the Suspended Solids Standards for Yukon Streams Subject to Placer Mining. A paper developed for the Interdepartmental Committee on Placer Mining.

8) Department of Fisheries and Oceans, 1983. A Rationale for the Classification of Rivers, Streams and Lakes in the Yukon Territory in Relationship to the Placer Mining Guidelines. A paper developed for the Interdepartmental Committee on Placer Mining.

9) Ennis, G.L., Cinader, A., McIndoe, S., and Munsen, T. 1982. An Annotated Bibliography and Information Summary on the Fisheries Resources of the Yukon River Basin in Canada. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1657.

10) Flynn, M. 1978. Guidelines for Land Development and Protection of the Aquatic Environment. Department of Fisheries and Oceans. Fisheries and Marine Service Technical Report No. 807.

11) Hardy Associates (1978) Ltd. 1978. Guidelines for Reclamation of Placer Mining Operations Klondike Region. Consultants Report to Yukon Territory Water Board.

12) Hardy Associates (1978) Ltd. 1981. Fish and Wildlife Habitat Recovery in Placer Mined Areas of the Yukon. Prepared for Department of Indian and Northern Affairs.

13) Langer, O.E. 1980. Effects of Sedimentation on Salmonid Stream Life. Environmental Protection Service.

14) Mathers, J.S., West, N.O. and Burns, B. 1981. Aquatic and Wildlife Resources of Seven Yukon Streams Subject to Placer Mining. Department of Fisheries and Oceans.

15) Sigma Resources Consultants. 1981. Water Use Technology For Placer Mining Effluent Control. Prepared for Department of Indian and Northern Affairs.

16) Toews, D.A.A. and Brownlee, M.J. 1981. A Handbook for Fish Habitat Protection on Forest Lands in British Columbia. Department of Fisheries and Oceans.

POOR

QUALITY

ORIGINAL